

## ON FOUR NEW PALAEARCTIC SPECIES OF THE GENUS *CECIDOMYIA* (DIPTERA, CECIDOMYIIDAE)

by

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### ABSTRACT

Larvae of the genus *Cecidomyia* live in resin of conifers, mainly pines. Twelve described species are recorded from North America, Europe and Asia. In this paper two new European and two new Asiatic species are described and figured: *C. harrisi*, *C. japonica*, *C. phagwariae* and *C. sarae*. A redescription of the type-species, *C. pini*, is given and a neotype is designated.

### INTRODUCTION

Larvae of the oldest gall midge genus *Cecidomyia* are known to live in resin of conifers, mainly pines. The first taxonomic revision of *Cecidomyia* was published by Gagné (1978 b). In his paper eleven species are recorded, eight from North America and Cuba, two from Europe and one, or possibly two, from the Himalayan region. The twelfth species, *C. bisetosa* Gagné, was discovered too late to be included in this revision (Gagné, 1978 a). *C. mesasiatica*, very briefly described from two males and one female by Mamajev (1971), was not included in Gagné's papers. This species was bred from resin on spruce in the Kirghizian Republic, USSR. I have been unable to obtain specimens for study, but the description indicates that *C. mesasiatica* closely resembles *C. magna* (Möhn). The genus *Cecidomyia* currently contains the following described species: *C. bisetosa* Gagné, *C. brevispatula* Gagné, *C. candidipes* Foote, *C. fortunactus* Gagné, *C. magna* (Möhn), *C. mesasiatica* Mamajev, *C. pini* (De Geer), *C. pininopsis* Osten Sacken, *C. reburrata* Gagné, *C. resinicola* (Osten Sacken), *C. resinicoloides* Williams and *C. tortilis* Gagné. However, examination of material bred from resin masses, taken from *Pinus sylvestris* L. in Europe, from *P. thunbergii* Parl. in Japan and from *P. roxburghii* Sarg. in Pakistan showed that four new species can be added. They will be described below.

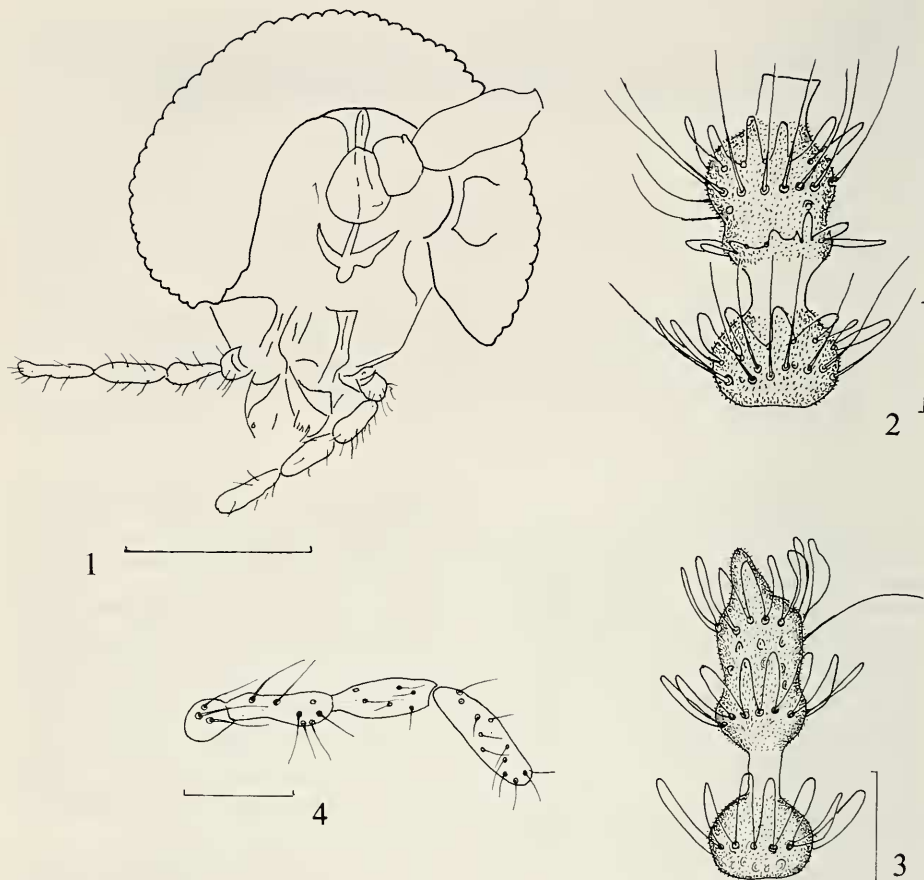
The larvae of these species of *Cecidomyia* live completely submerged in the resin, keeping their protruding hind spiracles free from it. The

European species are not known to cause economic damage but, according to Gagné (1978 b), the North American species promote breakage and secondary infection on twigs and branches of pines. *C. bisetosa* was the first species found to feed on cones, inducing malformations of the scales and preventing release of the seeds. The second record is that by Grijpma (1981). He found larvae of *C. pini* in resin exudations between the scales of green cones on *P. sylvestris* at Grubbenvorst, Province of Limburg, The Netherlands. However, it is not yet known if seed production and seed release were affected by the feeding of the larvae.

Referring to the literature mentioned here it may be concluded that *Cecidomyia* larvae feed directly on the plant tissue and not on the resin itself. It is more likely that the latter serves as a medium for protection, though several hymenopterous parasites were reared from them in the past years.

Pupation takes place in or outside the resin masses. According to Gagné (1978 b), Nearctic species that pupate apart from the resin have distinctive dorsal abdominal lobes (fig. 13), which may be helpful in leaving the mass. Contrary to this, *C. magna*, a European species, is recorded as pupating in the resin mass, unlike all the other species whose larvae have dorsal lobes (Möhn, 1955). However, in the winter of 1984-1985 I found a mature larva which had left the resin to pupate in a white cocoon attached to a branch of a spruce tree near Wageningen.

The following description of the European type-species is, as far as the adults are con-



Figs. 1—4. *C. pini*, 1: head; 2: third male flagellomere; 3: distal male flagellomere; 4: palp segments. Scale line of fig. 1: 0.25 mm, of figs. 2—4: 0.1 mm. Figs. 1—4 after neotype.

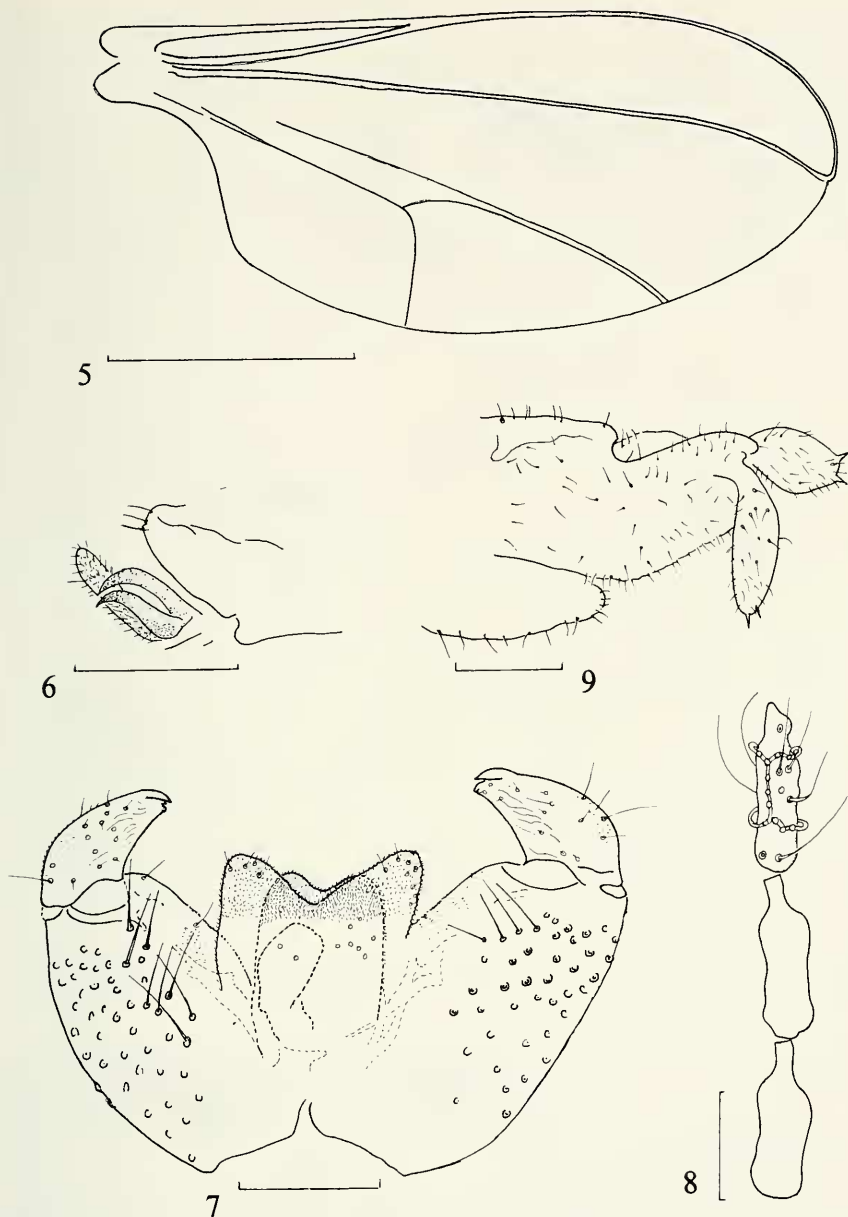
cerned, based on material from Sweden, where the type-locality is situated.

***Cecidomyia pini* (De Geer)**  
(figs. 1—14)

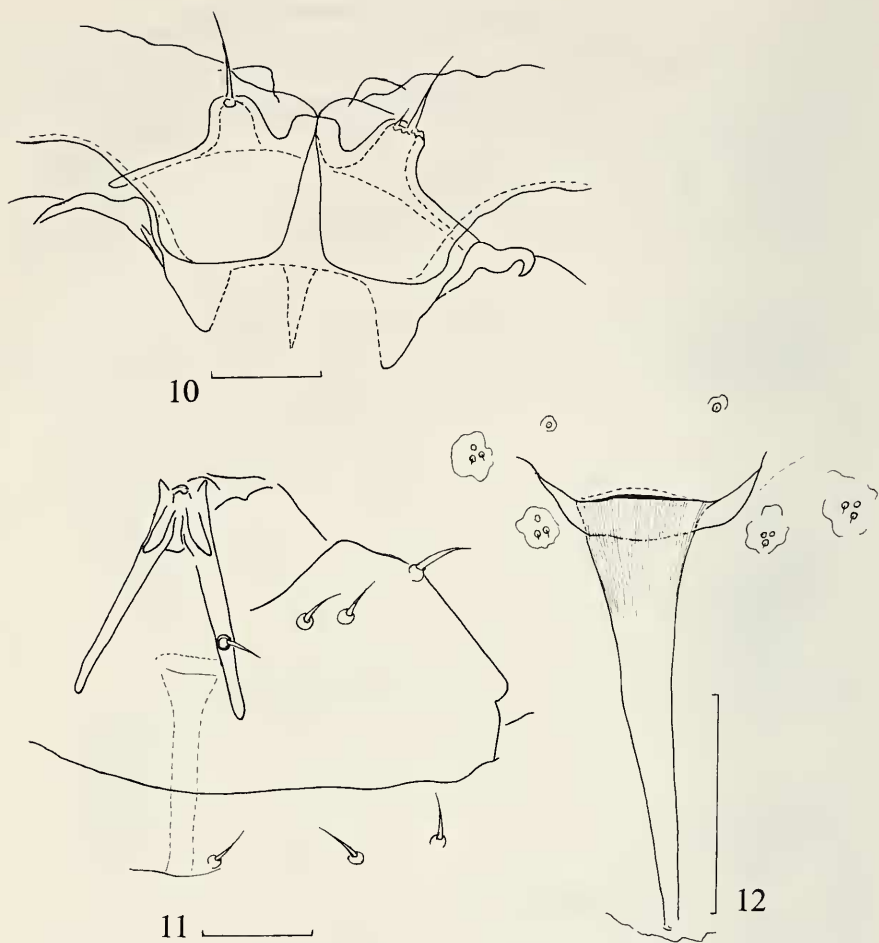
*Tipula pini* De Geer, 1776: 417 (Sweden).

The following subjective synonyms of *C. pini* are recorded by past authors: *C. pinimaritimae* (as *pini maritimae*) Dufour, 1838: 294 and *C. pilosa* Bremi, 1847: 31, 61. That synonymy was established when it was thought that only one species occurred in Europe. Gagné (1978 b) records that syntypes of *C. pinimaritimae* (two

♀ and two cocoons) were reared from *Pinus pinaster* Ait. (*P. maritima* Mill.), SW. France, and that it is not known if types exist or, if so, where, but that females and cocoons are not diagnostic. The type of *C. pilosa* Bremi is in poor condition, covered with fungal hyphae, sex undetermined, "Bre./Lindau" (nr. Zürich), in Entomologisches Institut, Eidgenössischen Technische Hochschule, Zürich, Switzerland. This information was provided to Gagné by W. Sauter of that Institute. Neither the type material nor the original descriptions of *C. pinimaritimae* and *C. pilosa* were adequate enough to use these names as subjective synonyms of *C. pini*



Figs. 5—9. *C. puni*, 5: wing; 6: tarsal claws; 7: male terminalia (dorsal); 8: distal female flagellomeres; 9: ovipositor (lateral). Scale line of fig. 5: 1 mm; fig. 6: 0.05 mm and figs. 7—9: 0.1 mm. Figs. 5—7 after neotype.

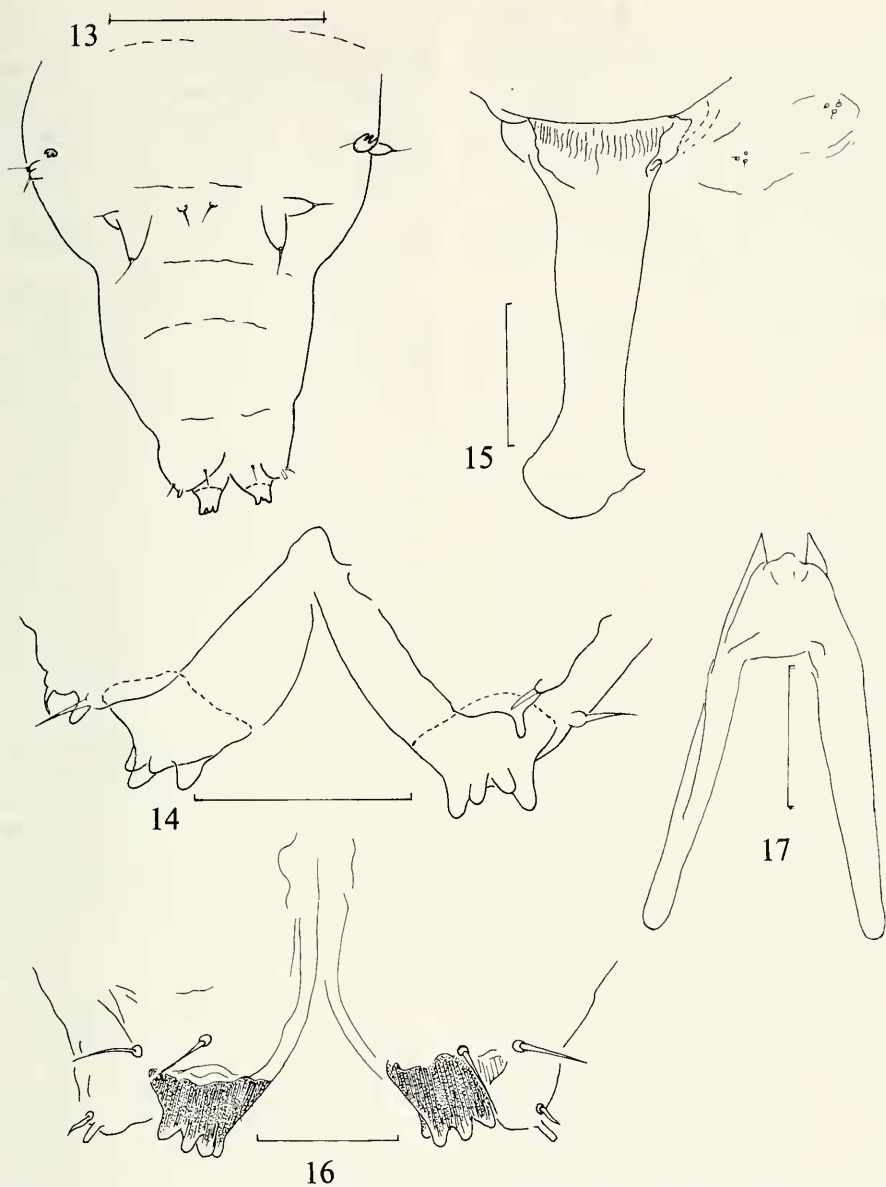


Figs. 10—12. *C. pini*, 10: pronotum (anterior); 11: head of last instar larva (dorsal); 12: sternal spatula. All scale lines 0.1 mm.

or as available names for my newly described European species.

Male. — Head without postvertical peak (fig. 1). Antenna with twelve flagellomeres, binodal, first and second not connate; three circumfila (fig. 2). Proximal node of third flagellomere: length about 0.76 times its diameter; distal node: length 1.18 times its diameter. Length of proximal stalk about 0.11 and of distal stalk 0.17 times the total length of third flagellomere. Proximal node with one whorl of looped circumfila and one whorl of long setae; length of

circumfila about 0.25 and length of setae 0.53 times the length of third flagellomere. Distal node with two whorls of looped circumfila and one whorl of setae; length of inferior circumfila of this node about 0.21, of superior circumfila 0.25 and of setae 0.35 times the length of third flagellomere. Nodes covered with microtrichia, stalks bare, distal flagellomere tapering into a short stalk-like process (fig. 3). Maxillary palps with four segments, about 0.54 times the height of head (fig. 4). Wing length about 2.5 mm and twice as long as wide; R 5 curved distally, joining C posterad of wing apex; C broken at junc-



Figs. 13—14. *C. pini*, 13: larval abdominal segment with dorsal tubercles; 14: larval terminal segment. Figs. 15—17. *C. magna*, 15: sternal spatula; 16: larval terminal segment; 17: larval head capsule. All scale lines 0.1 mm.

ture with R 5, Rs weak; M 3 + 4 fold present; Cu forked; R 5 about 2.2 times as long as R 1 (fig. 5). Legs covered with brown scales; tarsal claws all simple, curved beyond midlength; empodia longer than claws (fig. 6). Abdomen elongate cylindrical. Gonocoxite and gonostylus fairly stout; gonocoxite about 1.8 times as long as gonostylus, covered with setae except on inner side. Gonostylus with apical tooth. Cerci triangular, broadly rounded distally; hypoproct shallowly emarginated. Aedeagus simple, short and rounded apically (fig. 7).

Female. — Antenna with twelve uninodal, stalked flagellomeres, first and second not connate. Flagellomeres cylindrical with two circumfila connected by two longitudinal strands and with two whorls of setae (fig. 8). Node of third flagellomere with a length of about 2.85 times its diameter, length of stalk 0.2 times the total length of third flagellomere. Length of proximal whorl of setae about 0.38 and of distal setae 0.47 times the length of third flagellomere. Nodes covered with microtrichia, stalks bare. Distal flagellomere tapering with rounded tip. Maxillary palps with four segments and about 0.45 times height of head. Wing length about 3.2 mm and 2.4 times as long as wide; R 5 about 2.3 times as long as R 1. Abdomen elongate, ovoid. Ovipositor short, retractile; cerci with two short apical sensoria and covered with setae (fig. 9).

Pupa. — Antennal horn ridged anteriorly; pronotum as in fig. 10.

Last instar larva. — Length about 5.5 mm. Head capsule with apodemes of about 122  $\mu$  (fig. 11). Sternal spatula light brown; total length about 108  $\mu$ ; anterior end broadened, the cephalic margin somewhat convex (fig. 12). Pleural and dorsal abdominal papillae situated on tubercles, two lateral pairs of dorsal papillae each on a forked lobe (fig. 13). Length of setae of dorsal papillae from the left to the right: prothorax: about 17, 20, 14, 14, 20, 17  $\mu$ ; mesothorax: 20, 22, 14, 14, 22, 20  $\mu$ ; metathorax: 22, 24, 15, 15, 26, 21  $\mu$ ; 1st abdominal segment: 27, 34, 20, 20, 34, 27  $\mu$ ; 7th abdominal segment: 24, 27, 20, 19, 27, 24  $\mu$ . Terminal papillae: two on each side; one with tapered seta of about 17  $\mu$  and one with peg-like seta of about 14  $\mu$ . Terminal spiracles bilaterally symmetrical, four caudal prongs with a length of about 10  $\mu$  (fig. 14).

Original type material of *C. pini* must be considered non-existent (Prof. E. Sylvén, pers.

comm.) and, in the interest of taxonomic stability, I here designate the following neotype of this species. Neotype: ♂, slide no. 5192, Sweden, Uppland near Stockholm, E. Sylvén, reared from resin on *Pinus sylvestris* L., 1979. This designation stabilizes the usage by Barnes (1951), Möhn (1955), Vockeroth (1960), Mamajev & Krivosheina (1965) and Gagné (1978 b). Paratypes: ♀, slides no. 5193-5196, with same data as holotype. All specimens in the Swedish Museum of Natural History, Stockholm.

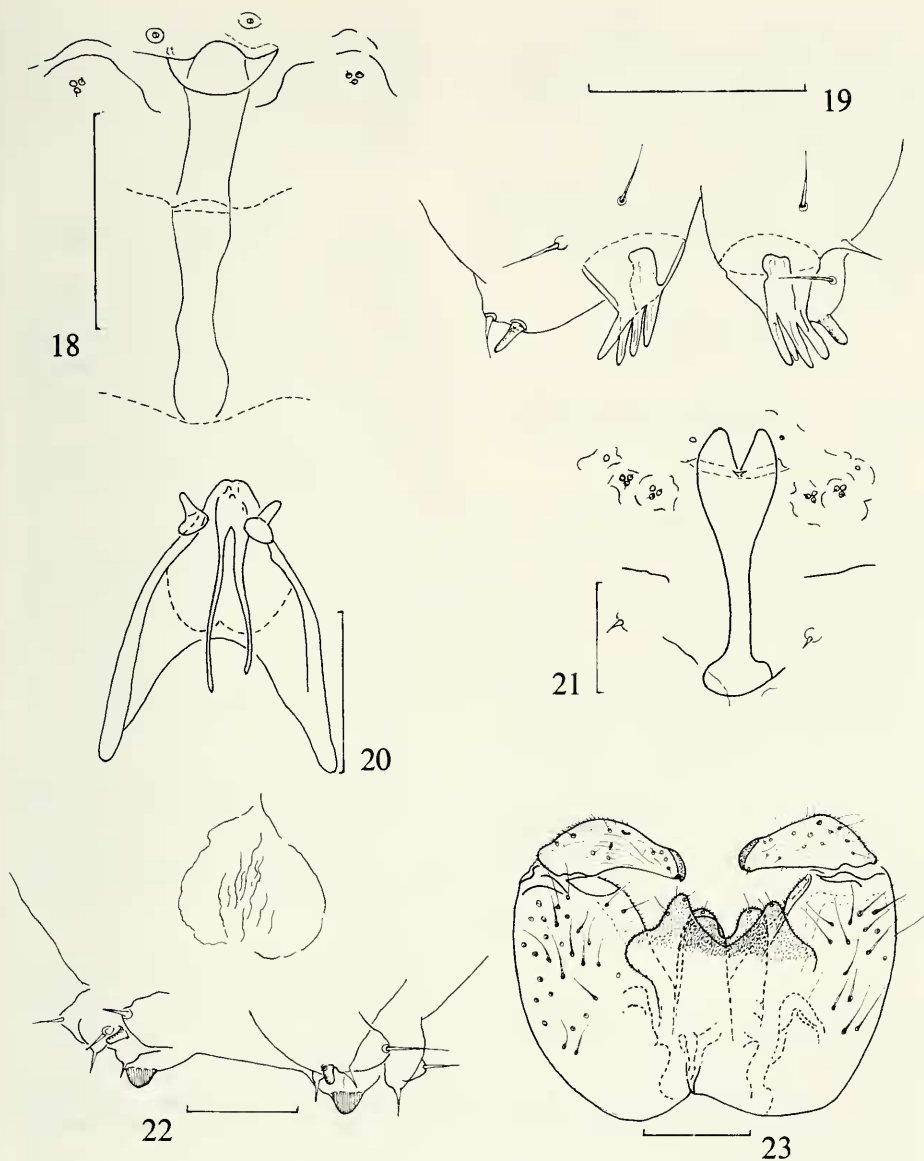
Other material (larvae, collected from resin on *P. sylvestris* in the Netherlands): slides no. 4537-4541, Grubbenvorst, October 1980, P. Grijpma, two year old cones; no. 4556-4566, Ede, 26.x.1980; no. 4573-4575, Ede, October 1980; no. 4576, Remmerden, 20.xi.1980; no. 4577-4579, Leuvenum, October 1980; no. 5146-5147, Wageningen, 6.xii.1984; no. 5158-5172, Grubbenvorst, 13.viii.1980, P. Grijpma, two year old cones. Pupal skin, slide no. 2225, from resinous cocoon on needle of *P. sylvestris*, Wageningen, 21.vii.1960. ♀, slide no. 3569, from resinous cocoon on needle of *P. sylvestris*, Remmerden, 1960. Specimens deposited in the collection of the Instituut voor Taxonomische Zoölogie (Zoölogisch Museum), Amsterdam.

Pupation of *C. pini* takes place apart from the resin mass in a white resinous cocoon. The fact that larvae from *C. harrisi* and *C. sarae*, from which the adults are still unknown, have been found together with those of *C. pini* in the same resin masses makes the exact identity of the remaining adult specimens in this collection rather uncertain. Study of more material, reared from identified larvae, will be necessary to clarify this problem.

### *Cecidomyia magna* (Möhn) (figs. 15-17)

*Stelechodiplosis magna* Möhn, 1955: 127-151 (Germany).

This second European species was originally described as *Stelechodiplosis magna* by Möhn (1955), but was included in *Cecidomyia* by Vockeroth (1960). It was found in Germany in the resin of spruce in which, according to Möhn (1955), it also pupates. However, in the winter of 1984-1985 I found a mature larva which had left the resin to pupate in a white cocoon like the other species whose larvae have two lateral pairs of dorsal papillae on prolonged lobes. The



Figs. 18—20. *C. sarae*, 18: sternal spatula; 19: larval terminal segment; 20: larval head capsule. Figs. 21—22. *C. harrisi*, 21: sternal spatula; 22: larval terminal segment. Fig. 23. *C. japonica*, male terminalia (dorsal). Scale line of fig. 20: 0.05 mm and of figs. 18, 19, 21, 22 and 23: 0.1 mm.



cocoon was attached to a branch of a spruce tree near Wageningen, The Netherlands (Nijveldt, 1985). Möhn included illustrations of male terminalia, larval spatula and larval terminal segments in his description. Figs. 15 and 16 show some larval characters.

A recent record of *C. magna* in England is: Shropshire, Cantlop near Shrewsbury, 18.x.1984, in resin masses on *Picea abies* (spruce). CIE Coll. A. 16422, four larvae in the British Museum (Natural History) (Dr K. M. Harris, pers. comm.)

#### *Cecidomyia sarae* n. sp.

(figs. 18—20)

I found the larvae of this species in resinous wounds and in resin lumps, caused by *Retinia resinella* L. (Lepidoptera) on *Pinus sylvestris*.

Adult and pupa.—unknown.

Last instar larva. — Length about 4.5 mm. Apodemes of head capsule about 122  $\mu$  (fig. 17). Sternal spatula dark brown, slender with a total length of about 108  $\mu$ ; anterior end not broadened, the cephalic margin convex (fig. 18). Pleural and dorsal abdominal papillae with short setae, situated on tubercles. No lateral pairs of dorsal papillae on prolonged lobes. Length of setae of dorsal papillae from the left to the right: prothorax: about 10, 14, 8, 8, 14, 10  $\mu$ ; mesothorax: 12, 15, 10, 10, 15, 14  $\mu$ ; metathorax: 17, 20, 8, 7, 19, 15  $\mu$ ; 1st abdominal segment: 20, 19, 10, 10, 18, 21  $\mu$ ; 7th abdominal segment: 17, 14, 7, 7, 14, 17  $\mu$ . Terminal papillae: two on each side; one with tapered seta of about 14  $\mu$  and one with peg-like seta of about 13  $\mu$ . Terminal spiracles longer mesally than laterally, four caudal prongs with a length of about 20  $\mu$  (fig. 19).

Holotype: one larva, in resin on branch of *P. sylvestris*, Ede (The Netherlands), 26.x.1980, W. Nijveldt, slide no. 4567. Paratypes: one larva with same data as holotype, slide no. 4568; one larva in resin lump on a twig of *P. sylvestris*, caused by the larva of *Retinia resinella*, Wageningen (The Netherlands), November 1960, W. Nijveldt, slide no. 2271. Specimens deposited in the collection of the Instituut voor Taxonomische Zoölogie (Zoölogisch Museum), Amsterdam.

I name this species after my wife Sara, in gratitude for her great help during my study of the Cecidomyiidae. *C. sarae* is also known from

England, where it was found in 1980 by Dr K. M. Harris (Commonwealth Institute of Entomology, London) in resinous wounds on *P. sylvestris* in the Wisley Garden of the Royal Horticultural Society. It is not known whether the larvae leave the resin to pupate.

#### *Cecidomyia harrisi* n. sp.

(figs. 21—22)

I found the larvae in resin on *Pinus sylvestris*.

Adult and pupa. — unknown.

Last instar larva. — Length about 3.3 mm. Apodemes of head capsule about 68  $\mu$  (fig. 20). Sternal spatula large, light brown, with a total length of about 211  $\mu$ ; anterior end broadened, the cephalic margin deeply cleft (fig. 21). Pleural and dorsal abdominal papillae with short setae, situated on small tubercles. Lateral pairs of dorsal papillae not on prolonged lobes. Length of setae of dorsal papillae from the left to the right: prothorax: about 4, 7, 7, 7, 7, 4  $\mu$ ; mesothorax: 5, 7, 7, 7, 7, 5  $\mu$ ; metathorax: 7, 7, 10, 10, 7, 7  $\mu$ ; 1st abdominal segment: 7, 7, 10, 10, 7, 7  $\mu$ ; 7th abdominal segment: 7, 9, 10, 10, 9, 7  $\mu$ . Terminal papillae: three on each side; two with tapered seta of about 14  $\mu$  and one with peg-like seta of about 14  $\mu$ . Terminal spiracles bilaterally symmetrical, no caudal prongs (fig. 22).

Holotype: one larva in resin on branch of *P. sylvestris*, Ede (The Netherlands), October 26.x.1980, W. Nijveldt, slide no. 4570. Paratypes: three larvae with same data as holotype, slides no. 4569, 4571 and 4572. Specimens deposited in the collection of the Instituut voor Taxonomische Zoölogie (Zoölogisch Museum), Amsterdam.

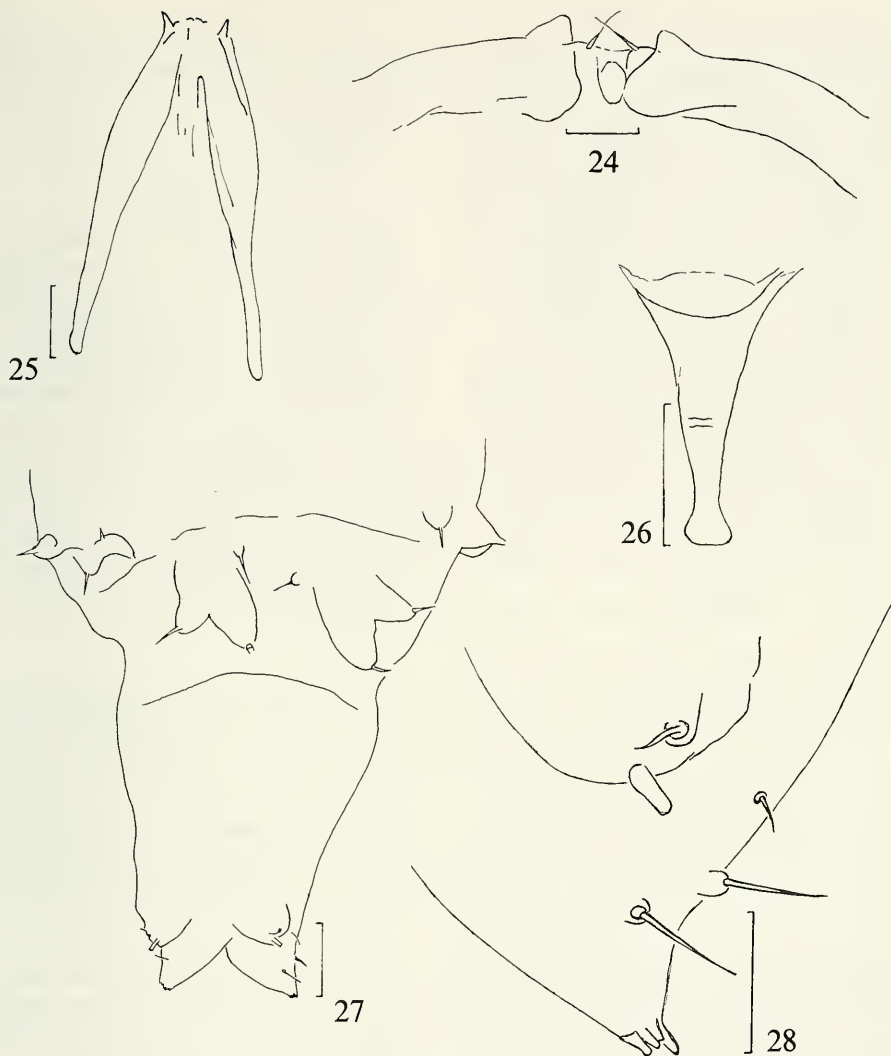
I name this species in honour of Dr K. M. Harris (Commonwealth Institute of Entomology, London), who collected this species in 1980 for the first time from resinous stem wounds on *P. sylvestris* in the Wisley Garden of the Royal Horticultural Society in England. *C. harrisi* closely resembles *C. fortunactus*, a species with mainly plesiomorphic characters, as discussed by Gagné (1978 b) in his analysis.

#### *Cecidomyia japonica* n. sp.

(figs. 23—28)

Dr J. Yukawa (University of Kagoshima, Japan) collected the larvae and reared the associated adults from resin on *Pinus thunbergii* Parl. in Japan.





Figs. 24—28. *C. japonica*, 24: pronotum (anterior); 25: larval head capsule; 26: sternal spatula; 27: larval abdominal segment with dorsal tubercles; 28: larval terminal segment. All scale lines 0.1 mm.

Male. — Head without postvertical peak. Proximal node of third flagellomere: length about 0.75 times its diameter; distal node: length about 1.7 times its diameter. Length of proximal stalk about 0.11 and of distal stalk 0.18 times the total length of third flagellomere. Proximal node with one whorl of looped cir-

cumfila and one whorl of long setae; length of circumfila about 0.21 and length of setae 0.62 times the length of third flagellomere. Distal node with two whorls of looped circumfila and one whorl of setae; length of inferior circumfila of this node about 0.18, of superior circumfila 0.25 and of setae 0.46 times the length of third

flagellomere. Distal flagellomere tapering into a long stalk-like process. Maxillary palps with four segments, about 0.44 times the height of head. Wing length about 2 mm and twice as long as wide; R 5 about 2.5 times as long as R 1. Legs covered with brown scales. Abdomen elongate cylindrical. Gonocoxite and gonostylus fairly stout; gonocoxite about 1.9 times as long as gonostylus, covered with setae except on inner side. Gonostylus with apical tooth. Cerci rounded apically; hypoproct narrower, incised, with rounded lobes. Aedeagus simple, short and broadly rounded apically (fig. 23).

Female. — Node of third flagellomere with a length of about 3.25 times its diameter, length of stalk 0.17 times the total length of third flagellomere. Length of proximal whorl of setae about 0.45 and of distal setae 0.5 times the length of third flagellomere. Distal flagellomere tapering with pointed tip. Maxillary palps with four segments and about 0.56 times height of head. Wing length about 3.1 mm and 2.4 times as long as wide; R 5 about 2.3 times as long as R 1. Abdomen elongate, ovoid.

Pupa. — Antennal horn pointed anteriorly (fig. 24).

Last instar larva. — Length about 4.3 mm. Apodemes of head capsule about 122  $\mu$  (fig. 25). Sternal spatula light brown with a total length of about 102  $\mu$ ; anterior end broadened, the cephalic margin somewhat convex (fig. 26). Pleural and dorsal papillae situated on tubercles; two lateral pairs of dorsal papillae each on a forked lobe (fig. 27). Length of setae of dorsal papillae from the left to the right: prothorax: about 17, 20, 17, 17, 20, 17  $\mu$ ; mesothorax: 24, 34, 14, 15, 34, 24  $\mu$ ; metathorax: 24, 31, 20, 20, 31, 22  $\mu$ ; 1st abdominal segment: 34, 41, 20, 20, —, 34  $\mu$ ; 7th abdominal segment: 31, —, —, 20, 34, 31  $\mu$ . Terminal papillae: two on each side; one with tapered seta of about 12  $\mu$  and one with peg-like seta of about 14  $\mu$ . Terminal spiracles bilaterally symmetrical, four caudal prongs with a length of about 13.6  $\mu$  (fig. 28).

Holotype: ♂, slide no. 5203, Koga, Fukuoka-pref., Kyushu, Japan, 6.v.1965 em., on *Pinus thunbergii*, reared by Yukawa. Paratypes: ♀, slide no. 5204, 5205 with same data as holotype; ♂, slides no. 5197—5199, Mitoma, Fukuoka-pref. Kyushu, Japan, 4—17.vii.1966 em., on *P. thunbergii*, reared by Yukawa; ♀, slides no. 5200—5202 with same data; one larva, slide no. 5206, Hanami, Fukuoka pref., Kyushu, Japan,

22.vi.1967, on *P. thunbergii*, J. Yukawa; pupal skins, slides no. 5207 and 5208 with same data. All specimens in the collection of the University of Kagoshima, Japan.

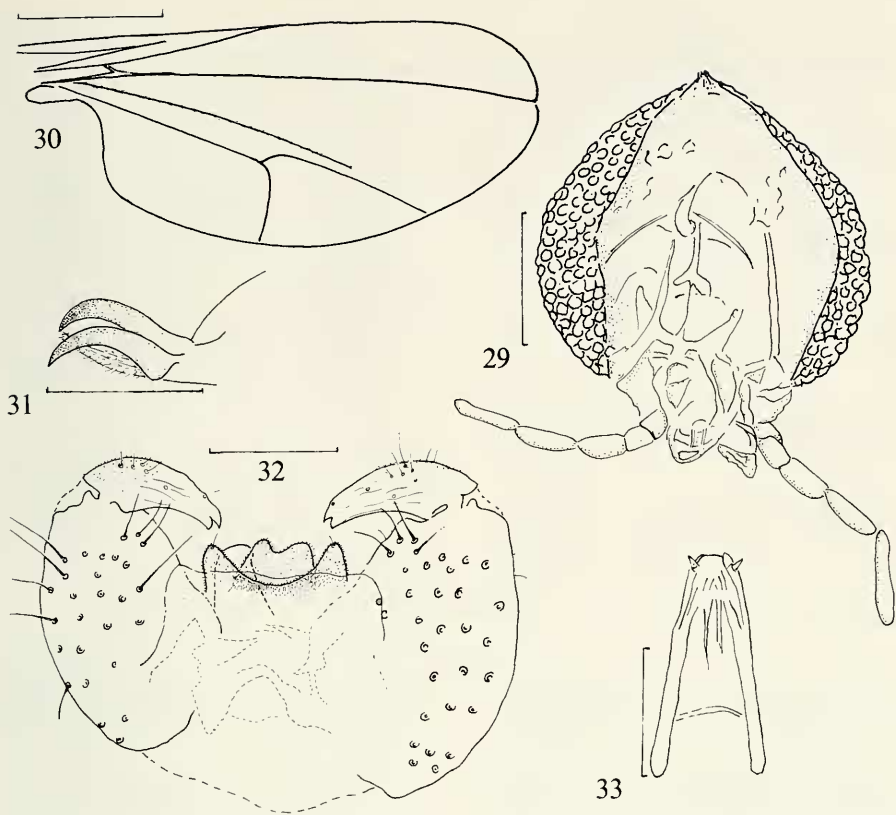
I name this species *japonica* because it is the first *Cecidomyia* species found in Japan.

### *Cecidomyia phagwariae* n. sp.

(figs. 29—36)

Gagné (1978 b) recorded an undescribed *Cecidomyia* species, which is known from a male, a female, and three larvae in the U.S. National Museum (Natural History) in Washington. They are from *Pinus roxburghii* in Pakistan. He did not describe this species because the male genitalia are slightly distorted on the slide and it was not known whether the larvae leave the resin mass to pupate. However, through the courtesy of Dr K. M. Harris, I have studied another three males, four females and one larva of the same origin from the collection of the British Museum (Natural History) in London. Together with the slides of the U.S. National Museum of Natural History, kindly sent on loan by Dr R. J. Gagné, they form the basis of the following description.

Male. — Head with postvertical peak (fig. 29). Antenna with twelve flagellomeres, binodal, first and second not connate; three circumfila. Proximal node of third flagellomere: length about 0.81 times its diameter; distal node: length about 0.79 times its diameter. Length of proximal stalk about 0.16 and of distal stalk 0.25 times the total length of third flagellomere. Proximal node with one whorl of looped circumfila and one whorl of setae; length of circumfila about 0.33 and length of setae 0.41 times the length of third flagellomere. Distal node with two whorls of looped circumfila and one whorl of setae; length of inferior circumfila of this node about 0.27, of superior circumfila 0.29 and of setae 0.66 times the length of third flagellomere. Nodes covered with microtrichia, stalks bare. Distal flagellomere tapering into a stalk-like process. Maxillary palps with four segments, about 0.48 times the height of head. Wing length about 2.7 mm and 2.4 times as long as wide; R 5 curved distally, but not so strongly as in *C. pini* and *C. japonica*, joining C at wing apex; C broken at juncture with R 5, R s weak; M3+4 fold present; Cu forked; R 5 about twice as long as R 1 (fig. 30). Legs covered with brown scales; tarsal claws all simple, curved beyond midlength and about as long as empodia



Figs. 29—33. *C. phagwariae*, 29: head; 30: wing; 31: tarsal claws; 32: male terminalia (dorsal); 33: larval head capsule. Scale line of fig. 29: 0.2 mm; 30: 1 mm, 31: 0.05 mm and figs. 32—33: 0.1 mm.

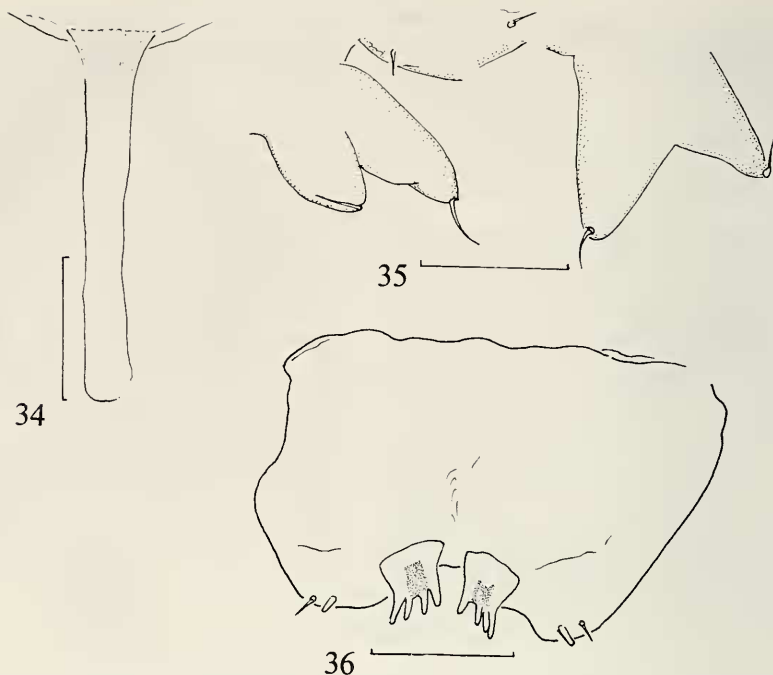
(fig. 31). Abdomen elongated cylindrical. Gonocoxite and gonostylus stout; gonocoxite about 1.6 times as long as gonostylus, covered with setae except on inner side. Gonostylus with apical tooth. Cerci broadly rounded distally; hypoproct shallowly emarginated. Aedeagus simple, longer than hypoproct and rounded apically (fig. 32).

Female. — Antenna with twelve uninodal flagellomeres, which are cylindrical with two circumfila connected by two longitudinal strands. Node of third flagellomere with a length of about 2.87 times its diameter, length of stalk 0.18 times the total length of third flagellomere. Length of proximal whorl of setae about 0.76 and of distal setae 0.39 times the length of third flagellomere. Nodes covered

with microtrichia, stalks bare. Distal flagellomere tapering with pointed tip. Maxillary palps with four segments, about 0.52 times the height of head. Wing length about 3.6 mm and 2.5 times as long as wide; R 5 2.3 times as long as R 1. Abdomen elongate, ovoid. Ovipositor short, retractile; cerci with two short apical sensoria and covered with setae.

Pupa. — unknown.

Last instar larva. — Length about 6.3 mm. Apodemes of head capsule about 109  $\mu$  (fig. 33). Sternal spatula light brown with a total length of about 204  $\mu$ , anterior end broadened, the cephalic margin nearly straight (fig. 34). Pleural and dorsal abdominal papillae situated on tubercles, two lateral pairs of dorsal papillae each on a forked lobe (fig. 35). Length of



Figs. 34—36. *C. phagwariae*, 34: sternal spatula; 35: dorsal abdominal tubercles; 36: larval terminal segment. Scale line of fig. 35: 0.2 mm, of figs. 34 and 36: 0.1 mm.

setae of dorsal papillae from the left to the right: prothorax: about 27, 34, —, 26, 34, 27  $\mu$ ; mesothorax: 38, 41, 30, 30, 41, 38  $\mu$ ; metathorax: 41, 48, 30, 27, 48, 41  $\mu$ ; 1st abdominal segment: 57, 63, 31, 31, 63, 57  $\mu$ ; 7th abdominal segment: 54, 54, 30, 27, 54, 54  $\mu$ . Terminal papillae: two on each side; one with tapered seta of about 14  $\mu$  and one with peg-like seta of about 14  $\mu$ . Terminal spiracles bilaterally symmetrical, four caudal prongs with a length of about 14  $\mu$  (fig. 36).

The following specimens are in the British Museum (Natural History): Holotype: ♂, slide no. 17.270, Phagwari, Pakistan, 3—12—70, on *P. roxburghii* Sarg., CIBC, 5B 12/70, 47B 964, BM, 1975 CIE coll. A 4502. Paratypes: ♀, slide no. 17.275, 962 with same data as holotype; ♂, slide no. 17.272, 960 and ♀ slide no. 17.274, 961 with same data; ♀, slide no. 17.273, 965, Lathrar, Pakistan, 4—12—70, on *P. roxburghii*, SB. 12/70—48 B; three larvae, slides no. 5209—5211. Lathrar, Pakistan, on *P. roxburghii*, 9.xii.1970, CIBC CIE A 4502. Specimens in the

U.S. Museum of Natural History: Paratypes: ♂, slide 974, with same data as holotype; ♀, slide 973, Lathrar, on *P. roxburghii*, 9—12—70, CIBC (Pakistan Sta.) 71—2291, SB, 12/70—48B; one slide with three larvae with same data.

I name this species after its type locality in Pakistan.

#### KEY TO LAST INSTAR LARVAE (EXCEPT THOSE OF *C. MESASIATICA*).

1. Abdomen without dorsal lobes ..... 2
- Abdomen with dorsal lobes (figs. 13, 28, 37) ..... 3
2. Spatula large, light brown, cephalic margin deeply cleft (fig. 21); terminal spiracles bilaterally symmetrical, no caudal prongs (fig. 22); from *Pinus sylvestris* ..... *C. harrisi* Nijveldt
- Spatula shorter, dark brown, cephalic margin convex (fig. 18); terminal spiracles longer mesally than laterally, four rather long caudal prongs (fig. 19); from *P. sylvestris* ... *C. sarae* Nijveldt

3. Spatula short, light brown, cephalic margin somewhat convex, shaft long and slender, tapering slowly (fig. 12); terminal spiracles bilaterally symmetrical, four caudal prongs of moderate length (fig. 14); from *P. sylvestris* ..... *C. pini* (De Geer)
- Spatula shorter than in *C. pini*, light brown, cephalic margin somewhat convex, shaft broader and tapering quickly (fig. 27); terminal spiracles bilaterally symmetrical, four caudal prongs of moderate length (fig. 29); from *P. thunbergii* .... *C. japonica* Nijveldt
4. Spatula long, light brown, cephalic margin nearly straight, shaft slender (fig. 36); terminal spiracles bilaterally symmetrical, four caudal prongs of moderate length (fig. 38); from *P. roxburghii* ..... *C. phagwariae* Nijveldt
- Spatula long, black, cephalic margin straight, shaft broad (fig. 15); terminal spiracles bilaterally symmetrical, four caudal prongs of moderate length (fig. 16); from *Picea abies* ..... *C. magna* (Möhn).

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